



DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2020-0901; Project Identifier AD-2020-00705-E; Amendment 39-21459; AD 2021-05-16]

RIN 2120-AA64

Airworthiness Directives; Pratt & Whitney Division Turbofan Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: The FAA is adopting a new airworthiness directive (AD) for certain Pratt & Whitney Division (PW) PW4164, PW4164-1D, PW4168, PW4168-1D, PW4168A, PW4168A-1D, and PW4170 model turbofan engines. This AD was prompted by several reports of low-pressure turbine (LPT) 4th-stage vane cluster assemblies leaning back and notching into the rotating LPT 4th-stage blades, causing some blades to fracture and release. This AD requires initial and repetitive replacements of the LPT 4th-stage air sealing ring segment assemblies with parts eligible for installation. This AD also requires initial and repetitive dimensional inspections of the LPT case for bulging and, depending on the results of the dimensional inspections, repair or replacement of the LPT case. The FAA is issuing this AD to address the unsafe condition on these products.

DATES: This AD is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

The Director of the Federal Register approved the incorporation by reference of a certain publication listed in this AD as of [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: For service information identified in this final rule, contact Pratt & Whitney, 400 Main Street, East Hartford, CT 06118; phone: (800) 565-0140; email: help24@prattwhitney.com; website: <http://fleetcare.pw.utc.com>. You may view this service information at the FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the

availability of this material at the FAA, call (781) 238-7759. It is also available at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2020-0901.

Examining the AD Docket

You may examine the AD docket at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2020-0901; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this final rule, any comments received, and other information. The address for Docket Operations is U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590.

FOR FURTHER INFORMATION CONTACT: Carol Nguyen, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7655; fax: (781) 238-7199; email: carol.nguyen@faa.gov.

SUPPLEMENTARY INFORMATION:

Background

The FAA issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 by adding an AD that would apply to certain PW PW4164, PW4164-1D, PW4168, PW4168-1D, PW4168A, PW4168A-1D, and PW4170 model turbofan engines. The NPRM published in the *Federal Register* on October 1, 2020 (85 FR 61886). The NPRM was prompted by six reports from the manufacturer concerning LPT 4th-stage vane cluster assemblies leaning back and notching into rotating LPT 4th-stage blades, causing some blades to fracture and release. These incidents resulted in an aborted takeoff, air turnbacks, engine surges, high vibrations, and unplanned engine removals. The incidents were attributed to the LPT 4th-stage air sealing ring segment assemblies moving into the LPT 4th-stage blades knife edge seals, resulting in damage to the ring segment assemblies. In the NPRM, the FAA proposed to require initial and repetitive replacements of the LPT 4th-stage air sealing ring segment assemblies with parts eligible for installation. The FAA also proposed in the NPRM to require initial and repetitive dimensional inspections of the LPT case for bulging and, depending on the results of the

dimensional inspection, repair or replacement of the LPT case. The FAA is issuing this AD to address the unsafe condition on these products.

Discussion of Final Airworthiness Directive

Comments

The FAA received comments from two commenters. The commenters were Air Line Pilots Association (ALPA) and Delta Air Lines, Inc. (Delta). ALPA supported the proposal without change. Delta supported the proposal but recommended certain changes. The following presents the comments received on the NPRM and the FAA's response to each comment.

Request to the Revise Required Actions

Delta requested that the FAA revise paragraph (g)(5) of this AD to specify that any currently approved manual repairs are acceptable to return an LPT case to service. Delta stated that if Pratt & Whitney were to add additional repairs for Index 20 or Index 27 to the CIR Manual, it is unclear whether operators would be permitted to repair the LPT case per the latest manual revision or would be restricted to those manual revisions currently listed in Table 1 of Pratt & Whitney Alert Service Bulletin (ASB) PW4G-100-A72-262 Revision No. 1, dated September 3, 2020.

The FAA disagrees with revising paragraph (g)(5) of this AD since this paragraph does not require use of a specific repair. Operators may use any approved repair to return the LPT case to a serviceable condition. The FAA did not change this AD.

Request to the Revise a Definition

Delta requested that the FAA revise paragraph (h)(1) of this AD to restrict the definition of "engine shop visit" to only those visits in which flanges H through P are separated. Delta reasoned that while the ASB clarifies that flanges H through P, as identified in the PW4168 Engine Manual, Chapter/Section 72-00-00 Engine General, Description/Operation-01, Figure 6, constitute "major mating engine flanges," the proposed rule would require teardown of the LPT module in instances when one of the flanges forward of flange H was separated to perform minor repairs on the cold section of the engine.

The FAA agrees and has revised paragraph (h)(1) of this AD to define “an engine shop visit” as the induction of an engine into the shop for maintenance involving the separation of pairs of major mating engine flanges H through P.

Conclusion

The FAA reviewed the relevant data, considered any comments received, and determined that air safety requires adopting this AD as proposed. Accordingly, the FAA is issuing this AD to address the unsafe condition on these products. Except for minor editorial changes, and any other changes described previously, this AD is adopted as proposed in the NPRM. None of the changes will increase the economic burden on any operator.

Related Service Information under 1 CFR Part 51

The FAA reviewed Pratt & Whitney ASB No. PW4G-100-A72-262, Revision No. 1, dated September 3, 2020. The ASB describes procedures for replacing the LPT 4th-stage air sealing ring segment assemblies and inspecting the LPT case for bulging. This service information is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in ADDRESSES.

Costs of Compliance

The FAA estimates that this AD affects 99 engines installed on airplanes of U.S. registry.

The FAA estimates the following costs to comply with this AD:

Estimated costs

Action	Labor Cost	Parts Cost	Cost per product	Cost on U.S. operators
Inspect the LPT case for bulging	2 work-hours x \$85 per hour = \$170	\$0	\$170	\$16,830
Replace the LPT 4th-stage air sealing ring segment assemblies	50 work-hours x \$85 per hour = \$4,250	\$64,592	\$68,842	\$6,815,358

The FAA estimates the following costs to do any necessary repair or replacement that would be required based on the results of the inspection. The agency has no way of determining the number of engines that might need these repairs or replacements.

On-condition costs

Action	Labor Cost	Parts Cost	Cost per product
Repair LPT case to restore dimensions	250 work-hours x \$85 per hour = \$21,250	\$0	\$21,250
Replace the LPT case	0 work-hours x \$85 per hour = \$0	\$1,300,000	\$1,300,000

Authority for this Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs, describes in more detail the scope of the Agency's authority.

The FAA is issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: General requirements. Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

Regulatory Findings

This AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that this AD:

- (1) Is not a "significant regulatory action" under Executive Order 12866,
- (2) Will not affect intrastate aviation in Alaska, and

(3) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

The Amendment

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 14 CFR part 39 as follows:

PART 39 - AIRWORTHINESS DIRECTIVES

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§ 39.13 [Amended]

2. The FAA amends § 39.13 by adding the following new airworthiness directive:

2021-05-16 Pratt & Whitney Division: Amendment 39-21459; Docket No. FAA-2020-0901; Project Identifier AD-2020-00705-E.

(a) Effective Date

This airworthiness directive (AD) is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

(b) Affected ADs

None.

(c) Applicability

This AD applies to Pratt & Whitney Division (PW) PW4164, PW4164-1D, PW4168, PW4168-1D, PW4168A, PW4168A-1D, and PW4170 model turbofan engines with low-pressure turbine (LPT) 4th-stage air sealing ring segment assemblies, part number (P/N) 50N463-01 or P/N 50N526-01, installed.

(d) Subject

Joint Aircraft System Component (JASC) Code 7250, Turbine Section.

(e) Unsafe Condition

This AD was prompted by several reports from the manufacturer concerning LPT 4th-stage vane cluster assemblies leaning back and notching into the rotating LPT 4th-

stage blades, causing some blades to fracture and release. A manufacturer investigation into those reports determined that the leaning back of the LPT 4th-stage vane cluster assemblies was caused by damage to the LPT 4th-stage air sealing ring segment assemblies. The FAA is issuing this AD to prevent damage to the LPT 4th-stage air sealing ring segment assemblies, the LPT case, and the LPT 4th-stage blades. The unsafe condition, if not addressed, could result in uncontained release of the LPT 4th-stage blades, damage to the engine, and damage to the airplane.

(f) Compliance

Comply with this AD within the compliance times specified, unless already done.

(g) Required Actions

(1) For affected engines that have either the Talon IIA outer combustion chamber assembly, part number (P/N) 51J100 or P/N 51J382, or the Talon IIB outer combustion chamber assembly, P/N 51J381 or P/N 51J500, installed, at the next engine shop visit after the effective date of this AD, remove from service the LPT 4th-stage air sealing ring segment assemblies, P/N 50N463-01 or P/N 50N526-01, and replace with parts eligible for installation.

(2) For affected engines not referenced in paragraph (g)(1) of this AD, at the next LPT overhaul after the effective date of this AD, remove from service the LPT 4th-stage air sealing ring segment assemblies, P/N 50N463-01 or P/N 50N526-01, and replace with parts eligible for installation.

(3) For all affected engines, at each LPT overhaul after compliance with the required actions in paragraphs (g)(1) or (2) of this AD, remove from service the LPT 4th-stage air sealing ring segment assemblies, P/N 50N526-01, and replace with parts eligible for installation.

(4) During each replacement of the LPT 4th-stage air sealing ring segment assemblies required by paragraphs (g)(1), (2), and (3) of this AD, perform a dimensional inspection of the LPT case for bulging in accordance with the Accomplishment Instructions, paragraph 2, of PW ASB PW4G-100-A72-262 Revision No. 1, dated September 3, 2020 (the ASB).

(5) If, during the dimensional inspection of the LPT case required by paragraph (g)(4) of this AD, any LPT case found to be outside the serviceable limits specified in Table 1: Serviceable Limits and Repairs of the ASB, repair or replace the LPT case before further flight.

(h) Definitions

For the purpose of this AD:

(1) An “engine shop visit” is the induction of an engine into the shop for maintenance involving the separation of pairs of major mating engine flanges H through P. The separation of engine flanges solely for the purpose of transportation without subsequent engine maintenance does not constitute an engine shop visit.

(2) An “LPT overhaul” is when the LPT rotor is removed from the engine, all four disks are removed from the LPT rotor, and all blades are removed from the disks.

(3) “Parts eligible for installation” are LPT 4th-stage air sealing ring segment assemblies, P/N 50N526-01, with zero flight cycles since new or with a P/N not mentioned in this AD.

(i) Alternative Methods of Compliance (AMOCs)

(1) The Manager, ECO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in Related Information. You may email your request to: ANE-AD-AMOC@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

(j) Related Information

For more information about this AD, contact Carol Nguyen, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA, 01803; phone: (781) 238-7655; fax: (781) 238-7199; email: carol.nguyen@faa.gov.

(k) Material Incorporated by Reference

(1) The Director of the Federal Register approved the incorporation by reference (IBR) of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless the AD specifies otherwise.

(i) Pratt & Whitney Alert Service Bulletin No. PW4G-100-A72-262, Revision No. 1, dated September 3, 2020.

(ii) [Reserved].

(3) For Pratt & Whitney service information identified in this AD, contact Pratt & Whitney, 400 Main Street, East Hartford, CT 06118; phone: (800) 565-0140; email: help24@prattwhitney.com; website: <http://fleetcare.pw.utc.com>.

(4) You may view this service information at FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (781) 238-7759.

(5) You may view this service information that is incorporated by reference at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email: fedreg.legal@nara.gov, or go to: <https://www.archives.gov/federal-register/cfr/ibr-locations.html>.

Issued on March 10, 2021.

Lance T. Gant, Director,
Compliance & Airworthiness Division,
Aircraft Certification Service.

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